Nevada Public Education News

Practice – still required in the common core

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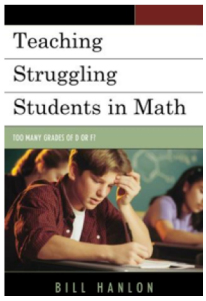
I was astonished when a local trustee told me they went to a professional development activity designed for trustees and it was insinuated that all that practice associated with math in the past was no longer necessary with the adoption of the common core. I wonder how much that national expert was paid for that advice. If the trustees buy that message and it is passed on to the teachers, then our math scores will never improve.



If we expect students to remember (learn) things and retain that information over time, there is no substitute for to practice – like anything else in life. The common core math standards require automaticity and procedural fluency – that comes from practice.

The common core standards require students to use the math they are learning for problem solving. To be able to do these performance tasks, students need to have experienced enough of the manipulation/equation solving type problems so doing them is considered implicit learning. Students can't have their brains focusing on how to solve, factor, find the slope and then wonder why they can't do the performance tasks required of the common core. In essence, if that is occurring, their brain is off task.

I'll define implicit learning as learning that allows us to do things automatically – without having to think your way though it. For instance, when little kids first learned to catch a ball, they typically open their mouths, close their eyes and are literally thinking about trying to catch the ball. Over time, as kids continue to play and practice fielding, they will often just reach up and grab a ball thrown in their direction like its almost instinctive. We need to keep that in mind in math classes. Stressing the basics; recognizing types of equations, different methods for solving them based upon the information given, graphing, polynomial and function operations, factoring, etc.

How many practice exercises are enough? I guess that would depend on the content and the student. But here is what I do know, if students have to continually try to remember a formula, or which numbers to substitute where so it is not automatic, then they have not done enough practice exercises.

Many math teachers are often criticized for having students practice (worksheets). That just isn't cool! Some administrators see teachers who present "cool" lessons as better teachers. So, what

would you rather have, a lesson that looks ***cool*** or a lesson where students are learning and can actually do the problems assigned with understanding, automaticity, procedural fluency and with greater probability of being able to solve higher order thinking problems?

> ***if students have to continually try to remember a formula, which numbers to substitute where so it is not automatic, then they have not done enough practice***

Practice for practice sake is not enough. Yes, we need procedural fluency and automaticity, but students need the practice at looking at problems and making a decision to which method they'll use to compute, solve, factor, graph, etc. For example, when I look at a system of equations, I make an instantaneous decision on the method I will use to solve it – graphing, linear combination, substitution, or matrices. With quadratic equations, again I make instantaneous decisions on whether to use completing the square, zero product property or the quadratic formula. Math is about decision-making, whether its about finding a common denominator by multiplying, writing multiples, LCM or the reducing method. Those decisions are based on experience that comes with practice. Students should also be able to explain why they chose one method over another.

As in sports, it is possible to have a bad practice session, one that is not focused, that does not result in improvement - one that is a waste of time. Proper planning with a stated objective for the practice will result in practice that helps students reach their academic goals. Simply put, you practice to learn – not to keep kids busy.

We all know we have to practice a skill to get better at it, but the improvement we're aware of making is only part of what's going on. Well past the point when we think we've "got it," continued practice allows our brain and our muscles to become more accurate and efficient in carrying out the task, even using less energy to do so. In an experiment published in the Journal of Neuroscience, study subjects who learned to manipulate a robotic arm needed to use progressively less effort to make the same movement, offering evidence that repeated practice allows the nervous system to continue refining the current skill, even as we may be itching to tackle the next one.

My point, practice is important. I'd also like to think that concepts and skills were developed so there is understanding, that they can see how it connects to other math and outside experiences, and that they will have the ability to reconstruct the mathematics when they forget it.

My concern is many understand the common core standards in math are more rigorous, that students are expected to solve more complex real life type problems – ***but that seems to be all they understand***. What seems to be lost is that the common core also calls for automaticity and procedural fluency of facts and procedures. Without those, without practice, students will not be able to perform the tasks required of them to meet the performance-based standards

Unfortunately, there are no shortcuts, ***what works is still work*** and that work consists of practice. Becoming highly proficient in math is not sexy or glitzy – its down and dirty. Repetition is still the mother of learning – some call that drill. Students of teachers who do not require practice are most often referred to as non-proficient and will have very little chance of meeting standards that are asked at higher levels.